

WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTERS
PATENT OF THE UNITED STATES IS:

1. A ground fault interrupter, comprising:

a switch provided in electric lines connecting an electric power source and an electric load;

a zero-phase current transformer configured to detect unbalanced current flowing in the electric lines;

a detection resistor connected in parallel to the zero-phase current transformer and configured to convert current outputted from the zero-phase current transformer to voltage;

a controller configured to determine based on the voltage of the detection resistor whether an electric leak occurs and configured to open the switch when the controller determines that an electric leak occurs; and

at least one filter provided between the detection resistor and the controller and configured to remove high frequency elements in the voltage of the resistor, the at least one filter comprising:

an input side resistor connected in series to the controller and configured to limit current input to the controller; and

a capacitor connected in parallel to the controller.

2. A ground fault interrupter according to Claim 1, wherein a resistance value of the input side resistor and a capacitance value of the capacitor are determined such that the controller determines that an electric leak occurs when a ground fault actually occurs and determines that an electric leak does not occur when a ground fault actually does not occur.

3. A ground fault interrupter according to Claim 1, wherein a resistance value of the input side resistor and a capacitance value of the capacitor are determined such that the filter

passes only elements in the voltage of the resistor having frequency between 0 and approximately 200 (Hz).

4. A ground fault interrupter according to Claim 1, wherein the controller is configured to determine that an electric leak occurs when the voltage of the detection resistor is higher than a predetermined threshold value.

5. A ground fault interrupter according to Claim 1, further comprising:
an additional current transformer configured to detect grounding; and
an alternating-current electric source configured to supply current to the additional current transformer to energize the additional current transformer.

6. A ground fault interrupter according to Claim 5, wherein the alternating-current electric source comprises:
a rectifier configured to rectify alternating-current; and
an oscillator configured to generate alternating-current from the rectified alternating-current.

7. A ground fault interrupter according to Claim 5, wherein the filter is configured to cut current having a frequency higher than a frequency of the alternating-current electric source.

8. A ground fault interrupter according to Claim 1, further comprising:
an additional current transformer configured to detect grounding; and
a rectifier configured to rectify alternating-current and connected to the additional current transformer via a coupling capacitor.

9. A ground fault interrupter according to Claim 1, further comprising:
an additional current transformer configured to detect grounding; and

a coupling capacitor which connects the additional current transformer and a commercial electric source.

10. A ground fault interrupter according to Claim 1, wherein the controller is configured to determine that an electric leak occurs when the voltage of the detection resistor is higher than a predetermined reference value which is lower than a predetermined threshold value to open the switch before an electric leak actually occurs.

11. A ground fault interrupter, comprising:

a switch provided in electric lines connecting an electric power source and an electric load;

a zero-phase current transformer configured to detect unbalanced current flowing in the electric lines;

a detection resistor connected in parallel to the zero-phase current transformer and configured to convert current outputted from the zero-phase current transformer to voltage;

a controller configured to open the switch when an electric leak is detected based on the voltage of the detection resistor; and

at least one filter provided between the detection resistor and the controller and configured to remove high frequency elements in the voltage of the resistor, the at least one filter comprising:

an input side resistor connected in series to the controller and configured to limit current input to the controller; and

a capacitor connected in parallel to the controller.

12. A ground fault interrupter, comprising:

a switch provided in electric lines connecting an electric power source and an electric load;

zero-phase current transforming means for detecting unbalanced current flowing in the electric lines;

detection means for converting current outputted from the zero-phase current transforming means to voltage, the detection means being connected in parallel to the zero-phase current transforming means;

controlling means for determining based on the voltage of the detection means whether an electric leak occurs and for opening the switch when the controlling means determines that an electric leak occurs; and

at least one filter means for removing high frequency elements in the voltage of the detection means and provided between the detection means and the controlling means, the at least one filter means comprising:

an input side resistor connected in series to the controlling means and configured to limit current input to the controlling means; and

a capacitor connected in parallel to the controlling means.